

**Notice of Allowability**

Application No.

10/611,572

Applicant(s)

NAIDU ET AL.

Examiner

Art Unit

Wes Tucker

2624

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to application filed 7-1-2003.
2. ☒ The allowed claim(s) is/are 1-47.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some\* c) ☐ None of the:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |   |   |
|---|---|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 5. <input type="checkbox"/> Notice of Informal Patent Application                     |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____ |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br>Paper No./Mail Date <u>3-29-04</u> | 7. <input type="checkbox"/> Examiner's Amendment/Comment                              |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material                  | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance  |
|   | 9. <input type="checkbox"/> Other _____   |

## DETAILED ACTION

### *Allowable Subject Matter*

Claims 1-47 allowed.

The following is an examiner's statement of reasons for allowance:

Independent claim 1 reads as follows:

**1. A method for decomposition of projection data acquired by scanning a set of objects using at least two x-ray spectra, the projection data including low energy projections (PI) and high energy projections (Ph), said method comprising:**

**A. solving the projections PI and Ph to determine a photoelectric line integral (Ap) component of attenuation and a Compton line integral (Ac) component of attenuation of the set of scanned objects using multi-step fitting; and**

**B. reconstructing a Compton image Ic and a photoelectric image Ip from Ac and Ap.**

The terms PI, Ph, Ap, Ac, Ic and Ip have all been mathematically defined in the specification on pages 17 and 18 and their derivations with respect to the variables used are further disclosed on subsequent pages.

The closest found prior art of record does not teach or fairly suggest the defined terms as claimed and as defined in the specification. Applicant cited prior art "Energy-selective Reconstructions in X-ray Computerized Tomography" to Robert E. Alvarez and Albert Macovski, hereinafter referred to as Alvarez, teaches different energy level projections for use in Compton and photoelectric reconstruction (Alvarez, p. 738), but Alvarez does not teach nor fairly suggest the process as defined and recited by the present application.

Applicant cited prior art "Generalized Image Combinations in Dual KVP Digital Radiography" by L.A. Lehmann, R.E. Alvarez, A. Macovski and W.R. Brody, hereinafter referred to as Lehmann, discloses a basis image estimation using a low energy and high energy projection (Lehmann, p. 662 and 663), but does not teach nor fairly suggest reconstructing a Compton image and a photoelectric image using line integrals as defined in the presently recited claims.

U.S. Patent 6,754,298 to Fessler discloses a method for reconstructing and image using differing energy measurements in the environment of CT scanning (column 3, lines 57-67), but does not teach nor fairly suggest the method as defined in the claims.

U.S. Patent 7,015,477 to Gunter discloses a method of using a Compton camera in radiography with particular focus on back-projection (column 6, lines 17-35), but does not teach nor fairly suggest the method as defined in the claims.

U.S. Patent 6,323,492 to Clinthorned also describes a Compton camera and method using energies at two different projections (column 4, lines 20-44), but does not teach nor fairly suggest the method as defined in the claims with respect to the terms calculated.

No other prior art of record teaches or fairly suggests the method of claim 1 as set forth with regard to the defined terms recited. The same discussion and reasons for allowance apply to independent claims 24, 26 and 46. All of the independent claims contain at least the details of claim 1. Therefore claims 1, 24, 26 and 46 and all of the corresponding subsequent dependent claims are also found to be allowable.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Prior Art***

The following is a list of prior art in the same field of endeavor as the present application that is also patentably distinct.

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U.S. Patent 5,293,195 to Berlad et al. discloses a correction of image artifacts caused by Compton scattering.

U.S. Patent 7,085,405 to Levovitz discloses a reconstruction of a tomographic image using Compton images.

U.S. Patent Application Publication Number US 2004/0251418 to Gunter discloses a back-projection algorithm similar to the Patent to Gunter discussed above.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wes Tucker whose telephone number is 571-272-7427. The examiner can normally be reached on 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on 571-272-2214. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Wes Tucker

11-8-06

  
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